

CLAIMS

1. A method for the production of metal  
5 coated steel products, comprising the steps of :
- providing a steel product with a metallic coating,
  - adding an additional metallic element to said coating,  
followed by a step of
  - subjecting said product to a thermal treatment,
- 10 characterized in that :
- prior to the addition of said additional element, said  
product is subjected to a plasma treatment, for cleaning  
and activating the surface of said coating,
  - said additional element is added through a physical  
15 vapour deposition technique,
  - said thermal treatment is applied by directing high  
energy infra red radiation towards the outer surface of  
said coating.
2. The method according to claim 1, wherein  
20 said metallic coating is chosen from the group consisting  
of : a Zn-coating, an Al-coating, a Zn-Al coating.
3. The method according to claim 1 or 2,  
wherein said additional metallic element is Mg, and wherein  
said Mg is added through sputtering or evaporation under  
25 low pressure.
4. The method according to any one of claims  
1 to 3, wherein said plasma treatment is a Dielectric  
Barrier Discharge (DBD) plasma treatment, taking place at a  
pressure of between 0.1bar and 1bar, under an atmosphere  
30 consisting of N<sub>2</sub> or of a mixture of N<sub>2</sub> and H<sub>2</sub>.
5. The method according to any one of claims  
1 to 3, wherein said plasma treatment takes place under  
vacuum.

6. The method according to any one of claims 1 to 5, wherein said thermal treatment is given under an inert atmosphere.

7. The method according to any one of claims 1 to 5, wherein said thermal treatment is given under air.

8. The method according to any one of claims 1 to 7, wherein said product is a steel sheet.

9. The method according to claim 8, wherein said infra red radiation is directed towards one side of said sheet, during a time interval between 5 and 10 s.

10. The method according to claim 8, wherein said infra red radiation is directed towards both sides of said sheet, during a time interval between 3 and 8s.

11. The method according to any one of the preceding claims, wherein the energy density of said infra red radiation is at least  $400\text{kW/m}^2$ .

12. Apparatus for performing the method of any one of claims 1 to 11, comprising :

- a means for performing a plasma treatment on a metal coated product,
- a means for adding an additional element to said coating by using a physical vapour deposition technique,
- a means for directing high energy infra red radiation towards the outer surface of said coating, after adding said additional element.